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CURRENT STATUS OF AQUATIC INSECTS IN THE LURÍN RIVER BASIN

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Abstract— The objective of the research is to establish the current state of aquatic insects in the Lurín-Peru river basin. Type of qualitative research, based on the characterization and recognition of the diversity of aquatic insects. the methodology consisted of samples taken at 3010 m. in the Lurín river basin (Huarochirí). As a result, 8 families and 10 genera were reported, of which the Hydroptilidae family and the Hydrobiosidae family represent 40% of the total identified genera. The first family includes the genera Neotrichia and Metrichia and the second family, Cailloma and Atopsyche. On the other hand, Vélez-Azañero et al. (2016) mention the order Coleoptera, family Dytiscidae with one morpho-species and the order Ditera, family Chironomidae with five morpho-species from samples from the lower part of the Lurín river in a study referring to ecosystem services.

Keywords: Insects, biodiversity, entomofauna

INTRODUCTION

Worldwide, insects occupy a predominant place within the animal kingdom, considered by scholars as the group with the largest number of identified and undiscovered species. In the case of aquatic insects, the subject of research, the information is very limited, which is demonstrated by the few studies carried out on aquatic insects. The scarce information has been sought by the means available, from all of this two scientific articles have been selected, one for the upper part [2] on the Order Trichoptera and another for the lower part of the Lurín River basin [3] in a study of epigeal insects reported morpho-species of the order Coleoptera and the order Diptera.

The study area, the Lurín river basin, consists of 5 hydrogeographic units:

Upper Lurín, Middle Upper Lurín, Middle Lurín, Middle Lower Lurín, Lower Lurín and the Pacific Ocean where it flows into (MINAM, 2017). On its way it passes through the different districts: San Damián, Langa, Lahuaytambo, Antioquia, Cieneguilla, Pachacamac, Lurín and OP.

In relation to the results, the analysis of the information collected has gone through a meticulous selection of all the specialized publications, which has allowed the taxonomic ordering in the part of the results, the discussion and the description based on the characteristics at the level of the data. orders of aquatic insects in general, of the families and genera studied from the Lurín river basin located in the provinces ofLima and Huarochiri. Due to the lack of specialized information, it had to be described and characterized at the order level, mentioning the families and few genera of aquatic insects for the Lurín river basin. The objective has been to establish the current state of aquatic insects in the Lurín river basin for educational and dissemination purposes at the level of teachers, students, and the interested public.

METHODOLOGY

The study area is located in the provinces of Lima and Huarochirí, located in the upper, middle and lower basins of the Lurín river, in the Lima region, Peru. The Lurín river basin consists of 5 hydrogeographic units: Upper Lurín, Middle Upper Lurín, Middle Lurín, Middle Lower Lurín, Lower Lurín and the Pacific Ocean where it flows (MINAM, 2017). On its route it passes through the following districts: San Damián, Langa, Lahuaytambo, Antioquia, Cieneguilla, Pachacamac, Lurín and OP.

Publications of previous specialized research on aquatic insects in the study area and scientific literature produced in nearby countries, mainly in South America, were compiled. The review, reading and analysis of the publications on aquatic insects of the Lurín river basin, and other similar ones, has been carried out, consisting of books, articles, taxonomic keys, field and laboratory guides; It has been detected that it is extremely limited for the study area, which is why publications from other countries have been used.

We proceeded, with the useful information collected, to prepare the characterization of the orders and to indicate some families, genera and species based on the information consulted for the Lurín river basin. The writing of guides for the identification of species, genera and families has always required, whenever possible, studies of local aquatic insects; the information is very scarce for the Lurín river basin. Based on the experience and the documentation at hand, an updated and practical publication has been prepared for educational purposes to be put at the service of teachers, students of the educational level and communities interested in knowing the aquatic insects of this wonderful area that It still offers great news to discover.

I.I RESULTS

Taxonomic List of Insects

Orden (3) especie (6)	Familia (10)	Género (10)/ Morfo-
Trichoptera	Helicopsychidae	Helicopsyche Siebold
	Hydrobiosidae	Atopsyche Banks
		Cailloma Ross& King
	Glossosomatidae	Mortoniella Ulmer
	Hydropsychidae	Smicridea McLachlan
	Hydroptilidae	Metrichia Ross
		Neotrichia Morton
	Leptoceridae	Nectopsyche Muller
	Limnephilidae	Anomalocosmoecus
Schmid		
	Philopotamidae	Chimarra Stephens.
Coleoptera	Dytiscidae	1 morfo-especie
Diptera	Chironomidae	5 morfo-especies

Classification of aquatic insects

The Insecta class is studied and organized into taxonomic categories; For the purposes of this study, the following have been considered: order, family, genus and species. By previous observation and, based on the information reviewed, there is no advanced and complete knowledge of aquatic insects in the Lurín river basin; need to be thoroughly investigated.

Orders of the class Insecta:

It takes into account those orders that are or can be represented in the place of study by experience in the Lurín river basin. Naturally, insects as a class are predominantly terrestrial, so at the order level there are nine recognized and are commonly found in water: Plecoptera, Ephemeroptera, Odonata, Hemiptera, Megaloptera, Trichoptera, Lepidoptera, Coleoptera and Diptera. Houseflies, known as stoneflies, and mayflies, called mayflies, are entirely aquatic. Other of the larger orders of moths, beetles, and midges are not entirely aquatic during their life cycles.

The characterization at the order level in this research has been based on various authors: Ross García-Barros et al [1], among others.

The description of each order of aquatic insects has been elaborated based on the most notorious or evident characters so that the scholar interested in knowing them, whether he is a teacher, student or public, can differentiate them with some ease.

Order Plecoptera

Commonly known as "stone flies" since adults perch and rest on rocks in rivers. They have two pairs of similar, well-developed wings, with longitudinal veins and numerous cross veins forming a network, they are bare; at rest the wings are folded over the back of the body and the abdomen

with 11 segments and filiform cerci. Broad head with chewing mouthparts, a pair of long, threadlike antennae.

They are all aquatic. They live in running water attached to the stones of the rocky shore. The immature ones are known as nymphs, they are elongated and flattened, with a pair of caudal appendages at the end of the body. Most of them have filamentous gills below the body.

Order Ephemeroptera

Adults are commonly known as "mayflies". They are short-lived, so they do not feed and their mouthparts are reduced or atrophied.

They have two pairs of well-developed wings on the thorax, naked and similar in appearance, with longitudinal veins and numerous cross veins arranged in a network. The forewings are somewhat wider than the hindwings and have 2 or 3 fine cerci; at rest, the wings do not cover the body. Small head, with a pair of minute setose-like antennae, the abdomen with 10 segments and the end with 2 or 3 fine, long, filiform cerci.

Mayflies are all aquatic, living in fresh water. They go through a peculiar metamorphosis in which a subimago is formed, lasts for a short period of time, and transforms into the adult form. The nymphs are recognizable by the pairs (minimum 7) of gills on the sides of the abdomen. The body occasionally ends in 2, but usually in 3 elongated appendages. The Baetidae family is usually found in the water bodies of the Peruvian coast [3]

Order Odonata

They are commonly known as "dragonflies". They are all aquatic. In adults, from the lateral perspective, the head is elongated and freely movable, it has a pair of prominent, well-developed eyes, a pair of small, bushy antennae, two pairs of long, somewhat narrow wings with similar venation, the abdomen with 10 segments in the male, the copulatory organs are in the ventral part of the second abdominal segment. The body ends in a pair of short cerci that are involved in copulation in the reproductive process.

In this order, immatures are commonly known as naiads or nymphs and are recognizable for having a huge, jointed lip on the bottom of the head. The lip has raptor hooks and spines that can be extended forward for a distance.

considerable; this case is unique among the various modifications of the mouthparts of insects. It is an adaptation to capture their prey with ease. The nymphs of the zygoptera are distinguished by the possession of three flat lanceolate gills forming something similar to the tails at the end of the abdomen, they are oriented vertically and are moved from side to side to facilitate swimming. Anisopteran nymphs have their gills developed on the inner walls of a rectal respiratory chamber

not externally visible; the abdomen is broader than in the previous ones. They are very carnivorous; they feed on the larvae of mosquitoes and other groups in freshwater. It includes the following families: Aeshnidae, Libellulidae, Coenagrionidae, for the Peruvian coast.

Order Hemiptera

They are known as "bugs", in this case "water bugs". Their head is medium, they have a proboscis on the ventral part that serves as a sucking organ to suck liquids, well-developed antennae in aquatic adults, 2 pairs of wings on the thorax: the first pair are hemielitra, the second pair is membranous. ; there are cases in which they are apterous and in others they are reduced; its abdomen generally has 10 segments. The aquatic species of Hemiptera are found in submerged vegetation; they are an important group of predators in calm fresh waters. They can be present in good numbers and diverse. The nymphs resemble the adults so they are easily identified. Aquatic or semi-aquatic species of the various families inhabit freshwater: Notonectidae, Corixidae, Belostomatidae, Nepidae, Gelastocoridae, Hydrometridae, Gerridae, Veliidae, etc.

Order Megaloptera

Adults are known as "net-winged insects", the head is free, the mouthparts are chewing, antennae are generally filiform, two pairs of wings of the same shape, size and type of venation, three pairs of long and thin legs, thinned cylindrical abdomen with 10 segments, without rims. The larvae are elongated, with the lateral filaments on the sides of the abdomen; they are found under rocks in slow or fast flowing bodies of water; They are carnivores of small animals. The Corydalidae family and the Corydalus genus are observed in the Lurín river, and are reported in lagoons of the Rímac river basin.[5]

Order Coleoptera

Adults are known as "aquatic beetles", on the thorax they have two pairs of well-developed wings, the first have been modified into leathery leathery wings called elytra, which are responsible for covering and protecting the second pair of membranous wings during rest. and these are used for the flight. Free head has chewing mouthparts, the 2 antennae can be long or conspicuous, three pairs of flattened legs, modified for swimming in water. Aquatic larvae of few families are found in the water. Both adults and larvae are aquatic, they go through complete metamorphosis, the appearance of larvae and adults are different, they are not similar. It is frequent see and observe them in the fresh waters of the Peruvian coast to two families Dytiscidae and Hydrophilidae, with differentiable larvae and adults in their shape, size and appearance, the genera Rhantus, Megadytes and Tropisternus are known, respectively. In the lower part of Lurín, the Family Dytiscidae with 1 Morpho-species [4]

Order Trichoptera

Adults are commonly known as "combined midges", they are very small and thin, chewing mouthparts, filiform antennae, two pairs of wings covered with dense hair in the shape of a roof at

rest. It constitutes the single largest and most predominant group of aquatic insects. They are abundant in all fresh waters. When adults they resemble moths, they fly towards the light at night, they are of delicate colors, leaden, brown, etc. The larvae mostly live in cases of different materials and shapes, they are cylindrical, quadrangular or triangular, curved or spiral tubes. It has silk glands whose secretion is the basis for the construction of cases. On the Peruvian coast there is the Family Hydroptilidae with creamy-green larvae [2] recorded 8 families and 10 genera of material collected in the upper part of the Rímac River and Lurín River basins, Huarochirí Province, Lima.

Order Lepidoptera

They are known as "moths", adults with sucking-type mouthparts, a pair of variable antennae, even feathery in males. a pair of membranous wings covered with scales, the first being the largest. The larvae live in aquatic plants with segmented thoracic legs, the prolegs at least defined by rudimentary hooks. Few species of the Family Pyralidae have adapted to water to live on aquatic plants.

Order Diptera

Adults known as "flies" and "mosquitoes" are recognized by the first pair of membranous wings with scant venation, the second pair of wings are highly modified, forming seesaws or halteres, a pair of ridged antennae. The pronounced head with variable sucking mouthparts. The larvae of the Families: Tipulidae, Culicidae, Simuliidae, Ceratopogonidae, Chironomidae, Stratiomyidae, Tabanidae, among others of little significance, are totally or partially aquatic, with a very different appearance from adults, they can be distinguished from aquatic larvae.

from other groups because they lack thoracic legs, the characteristic shape of the larva of each family is evident, they can be differentiated. In the lower part of Lurín the Family Chironomidae is mentioned [3]. Larvae of Culicidae, Simuliidae, Chironomidae and Stratiomyidae have been observed in Lurín.

II. CONCLUSION

The study of the aquatic Insects as an objective to facilitate an organized and updated document of the AI in the theoretical, practical field and laboratory part. In such a way they can carry out appropriate practices for the responsiblemanagement of aquatic environments in recognition of biodiversity without harming life.

CONFLICT OF INTEREST

LOS AUTORES DECLARAN NO TENER CONFLICTO DE INTERESES

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